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WHAT IS CLAIMED IS:

1. A vibration meter for measuring a viscosity of a fluid flowing through a pipe, which vibration meter comprises:
- a transducer assembly
    - with at least one flow tube inserted into the pipe which
      - has a lumen conducting the fluid and
      - 10 --- is clamped at an inlet end and an outlet end so as to be capable of vibratory motion,
      - with an electromechanical excitation arrangement for producing spatial deflections of the flow tube, and
      - with a sensor arrangement, responsive to lateral
      - 15 deflections of the flow tube,
        - for generating a first sensor signal, representative of an inlet-side deflection of the flow tube, and
        - for generating a second sensor signal, representative of an outlet-side deflection of the
        - 20 flow tube,
      - the flow tube oscillating in operation relative to a position of rest at an adjustable excitation frequency to produce viscous friction in the fluid; and
      - meter electronics
      - 25 -- with an excitation circuit which generates an excitation current feeding the excitation arrangement, and
      - with an evaluating circuit
      - which derives from the first sensor signal and/or
      - 30 the second sensor signal and from the excitation current a viscosity value representative of the viscosity of the fluid.
2. A vibration meter as claimed in claim 1 wherein the
- 35 evaluating circuit generates from the first sensor signal

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and/or the second sensor signal an estimate of a velocity of a motion of the fluid, which causes viscous friction.

5        3. A vibration meter as claimed in claim 1 wherein the evaluating circuit generates from the excitation current a friction value representative of the viscous friction in the fluid.

10       4. A vibration meter as claimed in claims 2 and 3 wherein the evaluating circuit generates from the friction value and the estimate a quotient value representative of a damping of the oscillating flow tube caused by the viscous friction.

15       5. A vibration meter as claimed in claim 1 wherein elastic deformations of the lumen of the flow tube are caused by the spatial deflections of the flow tube.

20       6. A vibration meter as claimed in claim 5 wherein torsions are caused in the flow tube about a longitudinal axis by the spatial deflections of the flow tube.

25       7. A vibration meter as claimed in claim 1 which delivers a mass flow rate value  $X_m$  representative of an instantaneous mass flow rate of the fluid.

30       8. A vibration meter as claimed in claim 1 which delivers a density value  $X_p$  representative of an instantaneous density of the fluid.

9. A method of measuring a viscosity of a fluid flowing through a pipe using a vibration meter comprising:

- a transducer assembly
- with at least one flow tube inserted into the pipe
- 35       which in operation oscillates relative to a position of rest at an adjustable excitation frequency,

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- with an electromechanical excitation arrangement for producing spatial deflections of the flow tube, and
- with a sensor arrangement, responsive to lateral deflections of the flow tube, for sensing an inlet-side and an outlet-side deflection of the flow tube; and
- meter electronics with
  - an excitation circuit which generates an excitation current feeding the excitation arrangement, and
  - 10 -- an evaluating circuit,
  - the vibration meter providing a density value, representative of a density of the fluid, and an excitation frequency value, representative of the excitation frequency,
- 15 said method comprising the steps of:
  - generating vibrations of the flow tube at the excitation frequency to produce viscous friction in the fluid;
  - sensing the excitation current feeding the excitation arrangement to generate a friction value
  - 20 representative of the viscous friction;
  - sensing an inlet-side and/or an outlet-side deflection of the flow tube to generate an estimate representative of a velocity of a motion of the fluid,
  - 25 which causes the viscous friction;
  - dividing the friction value by the estimate to obtain a quotient value representative of a damping of the oscillating flow tube caused by the viscous friction;
  - deriving from the density value and the excitation
  - 30 frequency value a correction value dependent on the density of the fluid and on the excitation frequency; and
  - deriving from the quotient value and the correction value a viscosity value representative of the
  - 35 viscosity of the fluid.

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10. A method as claimed in claim 9 wherein the viscosity value is obtained by dividing the quotient value by the correction value.

5 11. A method as claimed in claim 9 wherein the viscosity value is obtained by squaring the quotient value.